REMARKS

The rejections under 35 U.S.C. § 103(a) of:

Claims 1, 5, 6, 9, 29 and 31 as unpatentable over JP 06-348055 (JP '055), combined with U.S. 6,077,635 (Okado et al);

Claim 4 as unpatentable over JP '055 combined with Okado et al, further combined with U.S. 6,080,519 (Ishiyama et al) and U.S. 5,547,802 (Kawase et al);

Claims 1, 2, 9, 10 and 29-31 over JP 2000-112180 (JP '180) combined with Okado et al;

Claim 4 over JP '180 combined with Okado et al, further combined with Ishiyama et al and Kawase et al;

Claim 6 over JP '180 combined with Okado et al, further combined with U.S. 2001/0010887A1 (Sawano et al);

Claim 7 over JP '180 combined with Okado et al, further combined with U.S. 5,176,978 (Kumashiro et al);

Claim 8 over JP '180 combined with Okado et al, further combined with U.S. 5,902,709 (Nakayama et al); and

Claims 1, 2, 9-11 and 29-31 over JP '180 combined with U.S. 6,326,115 B1 (Nakanishi et al),

are all respectfully traversed.

As recited in Claim 1, the invention is a toner composition comprising:

toner particles comprising:

a binder resin; and

a colorant,

and a charge controlling agent which is at least located on a surface of the toner particles,

wherein the toner composition has a spherical degree of from 0.96 to 0.99, and wherein

the toner composition satisfies the following relationship:

$$10 \leqq M/T \leqq 1{,}000$$

wherein M represents a quantity of an element on a surface of the toner particles in units of % by weight, wherein the element is included only in the charge controlling agent, and is one of elements of second to fifth periodical elements in the long form periodic table other than carbon, oxygen and rare gas elements; and T represents a quantity of the element in the toner composition in units of % by weight.

The present invention is such that **a charge controlling agent (CCA) is present, at a high concentration, on a surface** (requirement 2) of **toner particles having a high circularity** (requirement 1) which can be prepared by a polymerization method or by subjecting toner particles prepared by a pulverization method to a spherical treatment, wherein the CCA is adhered to the surface of the toner particles by an external addition method (while applying a mechanical impact thereto).

By making toner particles having the recited components, and meeting both the recited spherical degree (SD) and charge controlling agent (M/T) limitations, Applicants are able to achieve a toner having superior image properties, and especially the combination of superior transferability, background fouling, haze factor, and fine line reproducibility, properties, as described in the specification at page 79, line 22 through page 81, line 24.

JP '055 relates to a polymerization toner to which a CCA is internally added while the concentration of the CCA at the surface of the toner particles is increased by decreasing the chance of migration of the CCA to the aqueous phase liquid. Specifically, in JP '055, a CCA is internally added together with a compound (such as aromatic oxycarboxylic acids, e.g., salicylic acid), which is added to reduce the chance of migration of the CCA into the aqueous phase liquid. In contrast, in the present invention the concentration of CCA at the surface of the toner particles can be increased by externally adding the CCA under specific conditions. In

addition, JP '055 discloses a toner comprising, *inter alia*, a wax and a charge control agent, each of which must meet specified relationships. With regard to the charge control agent, the ratio of amount, in mass %, of the charge control agent existing in the toner surface layer ("A") divided by the amount in mass % of the charge control agent (presumably in the entire toner) ("a"), i.e., A/a, must satisfy the following relationship: $5.0 \leq A/a < 50$. JP '055 exemplifies toners according to their invention wherein A/a ranges from a high of 24.93 (Example 3) and a low of 7.14 (Example 5). In effect, JP '055 does not appreciate the presently-recited M/T minimum of 10, or that SD has any importance.

Okado et al discloses a toner containing toner particles and an external additive having particular characteristics, wherein the toner particles have an SD of from 0.920 to 0.995, and contain particles with a circularity of less than 0.950 in an amount of from 2% by number to 40% by number (column 6, lines 49-64). Okado et al further discloses that if the SD is less than 0.920, the external additive tends to localize on the toner particle surfaces, tending to result in an unstable image density, and if the SD is more than 0.995, the external additive tends to be held on the toner particle surfaces with difficulty, resulting in an unstable charging to tend to cause fog (column 8, lines 52-58). In Okado et al, the CCA is internally added in the toner. In addition, Okado et al does not disclose or suggest the concentration of CCA at the surface of toner particles.

JP '180 is described in the specification at the paragraph bridging pages 3 and 4, and the last paragraph of page 4. As described in said last paragraph of page 4, JP '180 "specifies the concentration of the charge controlling agent on the surface of the toner particles and the concentration thereof in the whole toner particles. However, it is not attempted to positively arrange a charge controlling agent on the surface of toner particles, and therefore, the ratio of the concentration of the charge controlling agent on the surface of the toner particles to the concentration thereof in the whole toner particles is less than 10. Therefore, the charge rising

property of the toner is not satisfactory. In addition, since a charge controlling agent is included in the inside of the toner particles, the toner has an unsatisfactory fixability and transparency."

JP '180 discloses that said ratio is "$\geqq$ 4.0". The only ratio exemplified that is greater than 4.0 is 5 as shown, for example, in Table 6, wherein the results appear to be excellent. Indeed, JP '180 describes, with regard to a preferred embodiment, that the ratio "is 5 or more still more preferably 4.5 or more especially preferably" [0013]. Clearly, JP '180 provides no motivation to operate at a ratio greater than 5.

In addition, JP '180 relates to a toner prepared by a pulverization method and an internal addition method. The toner is not a spherical toner.

Nakanishi et al discloses a toner having a Wadell practical sphericity of 0.90 to 1.00, and stated to be superior in fluidity, transferability, storage stability under heat, low temperature fixing ability, and hot offset resistance (Abstract). Nakanishi et al discloses further that their Wadell practical sphericity is preferably 0.95 to 1.00 and more preferably 0.98 to 1.00 (column 3, lines 21-23). Nakanishi et al further discloses that a charge control agent may optionally be present (column 10, lines 27-28 and 36-37), but nothing with regard to how the charge control agent, if present, is distributed in the toner.

Applicants argued in the previous response that without the present disclosure as a guide, there would have been no motivation by one of ordinary skill in the art to combine the prior art as the Examiner has, and thus no *prima facie* case of obviousness has been made out, but nevertheless, the comparative data of record in the specification provides further evidence of patentability.

In response thereto, the Examiner finds that the reasons for combining references in a prior art rejection do not have to be those of Applicants. In reply, whether or not one skilled in the art would have been motivated to make a toner composition having a relatively high SD and

a relatively high M/T, the Examiner has not provided any evidence that one skilled in the art would know how to do this. While the prior art has disclosed a number of methods for including a CCA with a toner, it is difficult to allow a CCA to be present on the surface of spherical toner particles by an internal addition method. In addition, it is difficult to adhere a CCA to the surface of spherical toner particles because the adhesive force of the CCA to the surface of toner particles is low when the CCA is externally added under normal external additive conditions, and thereby a problem in that the CCA releases from the toner particles occurs.

In the present invention, a CCA can be fixed to a surface of spherical toner particles by externally adding the CCA under special conditions.

With regard to the above-discussed comparative data in the specification, the Examiner finds that it is insufficient to show unexpected results over the prior art because it does not compare to the closest prior art, which the Examiner finds is JP '055 (and presumably JP '180) as well), and is not commensurate in scope with the claims.

In reply, to the extent JP '055's disclosure of A/a is the same or substantially the same, in terms of definition, as the presently-recited M/T, the applied prior art disclose M/T and SD values, respectively, inside and outside the terms of the present claims, and do not recognize the significance of the presently-recited ranges for each. In addition, the comparative data is more pertinent than a comparison with any of the individual prior art references would be. Indeed, Comparative Examples 1-4 very closely approach meeting both the presently-recited SD and M/T limitations. Comparative Examples 1 and 2 meet the SD limitation, but are slightly below and slightly above the M/T limitation, respectively; Comparative Examples 3 and 4 meet the M/T limitation, but are slightly below and slightly above the SD limitation, respectively. Compare *Ex parte Humber*, 217 USPQ 265 (Bd. Pat. App. & Inter. 1981) (comparative data showing the claimed chlorine-containing compounds to be unexpected over

various (non-prior art) chlorine-containing isomers was accepted as more probative over prior art, drawn to non-chlorine containing analogs of the claimed compounds, asserted to be closest.)

Applicants continue to maintain the arguments made in the previous response. Rather than incorporate these arguments by reference, they are repeated below so that all of Applicants' arguments for patentability are stated in one document. Applicants begin by setting forth the comparative data below, wherein Examples 1-16 are according to the presently-claimed invention, and Comparative Examples 1-4 are not, as described in the specification at page 63, line 16 through page 74, line 14:

Table 2

	SD	CCA content 1 (wt%)	CCA content 2 (atom%)	M/T	CR	Dv (μm)	Dv/Dn
Ex. 1	0.962	2.51	1.63	27	0.55	9.3	1.31
Ex. 2	0.965	2.50	5.95	98	0.62	9.1	1.33
Ex. 3	0.975	2.49	8.86	147	0.51	8.6	1.28
Ex. 4	0.976	2.55	20.9	340	0.45	8.2	1.35
Ex. 5	0.980	2.48	23.2	387	1.35	8.6	1.25
Ex. 6	0.973	2.47	25.3	424	0.75	8.3	1.26
Ex. 7	0.972	2.50	23.9	395	1.15	8.9	1.30
Ex. 8	0.978	0.05	0.26	216	0.25	8.8	1.28
Ex. 9	0.972	0.24	3.00	517	0.45	9.5	1.26
Ex. 10	0.970	1.01	18.5	757	0.68	9.0	1.30
Ex. 11	0.976	2.50	20.8	345	0.55	5.5	1.18
Ex. 12	0.973	2.53	18.3	299	0.45	5.3	1.25
Ex. 13	0.979	2.47	23.1	387	0.62	7.5	1.17
Ex. 14	0.975	2.48	20.1	335	0.33	7.7	1.26
Ex. 15	0.980	0.26	4.55	724	0.92	5.1	1.15
Ex. 16	0.985	0.25	4.55	753	0.99	4.0	1.13
Comp. Ex. 1	0.963	2.52	0.20	8	0.34	8.3	1.31
Comp. Ex. 2	0.964	2.49	69.7	1158	0.55	8.6	1.28
Comp. Ex. 3	0.953	2.50	3.33	55	0.45	9.0	1.29
Comp. Ex. 4	0.992	2.48	5.51	92	0.62	8.8	1.30

As Table 2 demonstrates, Comparative Example 1 has an M/T lower than the above-recited range; Comparative Example 2 has an M/T higher than the above-recited range. Comparative Example 3 has an SD lower than the presently-recited range; Comparative Example 4 has an SD higher than the above-recited range.

The Examples and Comparative Examples were evaluated for the above-discussed properties, as described in the specification beginning at page 78, line 2. The results are shown in Table 3 at pages 81-82 of the specification, reproduced below:

Table 3

	Transferability (rank)	Background density		Haze factor (%)	Fine line reproducibility (rank)
		At the Beginning	After the running test		
Ex. 1	3 2	0.05 0.04	0.23 0.22	45 36	1 1
Ex. 2	3 2	0.01 0.03	0.21 0.25	65 55	2 2
Ex. 3	4 3	0.01 0.02	0.15 0.16	55 46	2 2
Ex. 4	4 3	0.06 0.07	0.22 0.22	78 68	1 1
Ex. 5	4 4	0.28 0.22	0.15 0.16	68 59	2 1
Ex. 6	4 3	0.06 0.07	0.07 0.09	46 36	1 2
Ex. 7	4 3	0.07 0.08	0.01 0.01	52 48	2 2
Ex. 8	4 3	0.07 0.08	0.24 0.26	13 11	2 2
Ex. 9	4 4	0.04 0.03	0.11 0.20	19 15	1 1
Ex. 10	4 3	0.02 0.01	0.08 0.13	26 22	1 1
Ex. 11	4 4	0.09 0.10	0.25 0.28	55 48	4 5
Ex. 12	4 3	0.08 0.07	0.23 0.20	48 39	3 4
Ex. 13	4 3	0.03 0.03	0.28 0.26	62 58	4 3

Ex. 14	4 4	0.07 0.06	0.30 0.36	68 67	3 2
Ex. 15	5 4	0.01 0.02	0.01 0.02	20 15	4 5
Ex. 16	5 5	0.00 0.00	0.00 0.01	11 9	5 5
Comp. Ex. 1	3 2	0.33 0.40	0.28 0.33	68 66	1 1
Comp. Ex. 2	3 2	Cannot be evaluated**		74 82	1 1
Comp. Ex. 3	1 1	0.08 0.10	0.33 0.44	77 77	2 2
Comp. Ex. 4	Cannot be Evaluated*	0.09 0.12	0.28 0.33	65 56	1 1

* the image cannot be evaluated because the image are seriously fogged.
** the image cannot be evaluated because the image has too low image density.

The manufacturing conditions of the toners of the Examples and Comparative Examples are shown in Table 1, at pages 74-75 of the specification. Comparative Examples 1 and 2 differ from Example 1 only by the rotation speed of a turbine blade used in the surface treatment, which is 50 m/s for Example 1, 30 m/s for Comparative Example 1, and 160 m/s for Comparative Example 2. Comparative Examples 3 and 4 differ from Example 1 only in the sphering treatment temperature. The sphering treatment temperature is 250°C for Example 1, 200°C for Comparative Example 3, and 350°C for Comparative Example 4. SD and M/T were determined for the Examples and Comparative Examples as described in the specification at page 75, last line. The results are shown in said Table 2, at pages 77-78 of the specification.

Applicants describe the following with regard to the data in Table 3, in the specification at page 83, lines 4-25, as follows:

> In Table 3, the upper numerals are of the images produced by the evaluation machine A and lower numerals are of the images produced by the evaluation machine B.
>
> As can be understood from Table 3, the toners having a spherical degree and a M/T ratio in the specific ranges of the present invention,

respectively, have good transferability and low background density. When the charge rising property of the toner is in the specific range of the present invention, the resultant images have low background density. In addition, when the toners do not have a charge controlling agent in the toner particles, the toner images have good transparency when the toner images are fixed. Further when the toners have a particle diameter and a particle diameter distribution in the specific ranges of the present invention, respectively, the toner images have good fine line reproducibility.

These properties of the toner prepared by the polymer suspension method (i.e., the toner of Example 16) are excellent. This is because the spherical degree, particle diameter distribution of the toner fall in the preferable ranges and the toner particles are subjected to a surface treatment of the present invention while the charge controlling agent is not included in the toner particles.

The above-discussed results could not have been predicted by the applied prior art.

It is also important to consider how the prior art included a CCA in a toner, and the special problems with spherical toners.

A CCA can be included in a toner by an internal addition method or an external addition method.

In the internal addition method, a CCA is kneaded with other toner constituents such as binder resins and colorants (in a pulverization method), or a CCA is included in an oil phase liquid together with other toner constituents (in a polymerization method), so that the CCA is included inside the toner particles.

In contrast, in the external addition method, the CCA is externally added to toner particle which are prepared by pulverizing a kneaded toner constituent mixture (in a pulverization method) or the CCA is externally added to granulized toner particles (in a polymerization method).

In a toner prepared by a pulverization method and an internal addition method, the CCA tends to be present on the surface portion of the toner particles. This is because when a kneaded mixture is pulverized, the kneaded mixture tends to be divided at the CCA portion. Therefore, it is not necessary to add a CCA by an external addition method.

In contrast, in a spherical toner prepared by pulverization followed by spherical treatment, the CCA tends to be buried in the toner particles, resulting in decrease of the concentration of CCA at the surface of the toner particles.

In a toner prepared by a polymerization method, the concentration of CCA at the surface of the toner particles is low. This is because CCAs are typically soluble in water and the CCA included in the oil phase liquid migrates from the oil phase to the aqueous phase even when the CCA is internally added in the oil phase liquid.

Thus, in spherical toners it is difficult to allow a CCA to be present on the surface of toner particles by an internal addition method. In addition, it is difficult to adhere a CCA to a surface of spherical toner particles because the adhesive force of the CCA to the surface of toner particles is low when the CCA is externally added under normal external additive conditions, and thereby a problem in that the CCA releases from the toner particles occurs.

In the present invention, a CCA can be fixed to a surface of spherical toner particles by externally adding the CCA under special conditions.

The following reiterates why the prior art does not present a *prima facie* case of obviousness.

Regarding Applicants' argument against the combination of JP '055 and Okado et al, JP '055 does not disclose a CCA external additive. The only reason disclosed in Okado et al for using toner particles having a particular SD range is because of the effect that it has on the external additive, which is not a CCA external additive. Since there is no CCA external additive in JP '055, there would be no reason for one skilled in the art to look for a solution in Okado et al to a non-existent problem in JP '055. Moreover, as discussed above, JP '055 does not appreciate the significance of the presently-recited M/T being at least 10, since JP '055, in essence, equate their A/a of 5 with an A/a of at least 10. Above-discussed Comparative Example 1 herein, which has an M/T of 8, and would thus be within the terms of JP '055 with

regard to this limitation, is inferior to Example 1 with regard to the properties of background density and haze factor, as shown in above-reproduced Table 3. Similarly, Comparative Examples 3 and 4 herein, which have an SD within the terms of Okado et al, but outside the terms of the present claims, are substantially inferior to Example 1 with regard to transferability and haze factor.

In sum, the combination of JP '055 and Okado et al does not present a *prima facie* case of obviousness. The above-discussed comparative data, nevertheless, is further evidence of patentability.

The other-applied prior art does not remedy the fundamental deficiencies in the combination of JP '055 and Okado et al.

Regarding Applicants' argument against the combination of JP '180 and Okado et al, Applicants continue to assert that JP '180 does not suggest an M/T of at least 10, for reasons discussed above. Furthermore, one skilled in the art would not have combined JP '180 and Okado et al, for essentially the same reasons that one skilled in the art would not have combined JP '055 and Okado et al. In addition, the above-discussed comparative data particularly with regard to Comparative Examples 1, 3 and 4, apply herein as well.

Regarding Applicants' argument against the combination of JP '180 and Nakanishi et al, even if one skilled in the art were to use the toner of JP '180 having a Wadell practical sphericity in the range disclosed by Nakanishi et al, one skilled in the art would still not appreciate the importance of the combination of both the presently-recited SD and M/T limitations, or the superior results obtained thereby, and as discussed above. Indeed, even within Nakanishi et al's most preferred Wadell practical sphericity range of 0.98 to 1.00, Applicants have shown, with regard to Comparative Example 4, unmeasurable transferability. While Nakanishi et al disclose that transferability is superior in their toner, it may be presumed

this is without regard to the presence and particular location of the optional charge control agent.

For all the above reasons, it is respectfully requested that the rejections over prior art be withdrawn.

The provisional rejections under the judicially created doctrine of obviousness-type double patenting of:

Claims 1, 2, 9-11 and 29-31 over Claims 1-10 of copending Application No. 10/392,894 (Application '894) in view of Nakanishi et al,

Claim 4 over Claims 1-10 of Application '894 in view of Nakanishi et al, further in view of Ishiyama et al and Kawase et al, and

Claim 6 over Claims 1-10 of Application '894 in view of Nakanishi et al and Sawano et al,

are respectfully traversed.

Claim 1 of Application '894 recites an M/T ratio of 20 to 500. The Examiner finds that the toner compositions recited in Claims 1 and 3 of Application '894 meet the compositional and M/T limitations recited in present Claim 1.

With regard to Nakanishi et al, its deficiencies have been discussed above, in that it does not appreciate the importance of the SD range herein, which exclude an SD above 0.99, while Nakanishi et al includes Wadell practical sphericities greater than 0.99 which, in Comparative Example 4 herein, has been shown to be inferior.

None of the remaining references remedy the fundamental deficiencies in the combination of the claims of Application '894 and Nakanishi et al.

In response to the above arguments, the Examiner has, in essence, made the same findings that were made with regard to the prior art rejections, discussed above. Thus, the Examiner finds that the reasons for combining references in a prior art rejection do not have to

be those of Applicants. Applicants' reply is the same as that made above. The Examiner also finds that the comparative data of record is insufficient. Applicants' reply is the same as that made above.

In addition, the Examiner is respectfully requested to hold the provisional rejections in abeyance until the present claims are found to be allowable but for these rejections. If, at that time, the copending application has not been allowed, then the present application should be allowed, and a non-provisional double patenting rejection made in the other application, if applicable. See M.P.E.P. 822.01. (Applicants do not concede that any such rejection would be applicable.)

For all the above reasons, it is respectfully requested that these rejections be withdrawn.

The rejection of Claim 31 under 35 U.S.C. § 112, first paragraph, as failing to satisfy the description requirement therein, is respectfully traversed. Indeed, the rejection is now moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that this rejection be withdrawn.

The objection to the disclosure with regard to the use of trademarks, in paragraph 4 of the Office Action, is respectfully traversed. Indeed, the objection is now moot in view of the above-discussed amendment. Accordingly, it is respectfully requested that this objection be withdrawn.

Applicants note the Examiner's statements in paragraph 4 of the Office Action, but no requirement has been made therein.

Applicants gratefully acknowledge the Examiner's indication of allowability of Claim 3. Nevertheless, Applicants respectfully submit that all of the presently-pending and active claims in this application are now in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

Respectfully submitted,

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